IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

PALTALK HOLDINGS, INC., Plaintiff, v. CISCO SYSTEMS, INC., Defendant.	CIVIL ACTION NO. 6:21-CV-00757-ADA JURY TRIAL DEMANDED

DECLARATION OF DR. VIJAY K. MADISETTI

I. INTRODUCTION & SCOPE OF ASSIGNMENT

1. My name is Dr. Vijay K. Madisetti. I am a Professor of Electrical and Computer Engineering at the Georgia Institute of Technology (commonly referred to as Georgia Tech) in Atlanta, Georgia.

2. I have been retained by Plaintiff Paltalk Holdings, Inc. (Paltalk) to serve as an expert in this matter where Paltalk alleges that Defendant Cisco Systems, Inc. (Cisco) has infringed Paltalk's U.S. Patent No. 6,683,858 (the '858 Patent). I have been engaged by Paltalk to provide opinions and testimony on the meaning of certain claim terms that are in dispute.

3. I have been asked to submit this Declaration with my opinion regarding various issues related to the features of the asserted patent claims.

4. I have also been asked to offer my opinion regarding the meaning of various terms in the asserted claims from the perspective of a person of ordinary skill in the art of the invention.

5. I submit this Declaration, which is based on the information that is currently available to me. I reserve the right to supplement my analysis in this Declaration in response to any reports or submissions submitted by or prepared on behalf of Cisco. I also reserve the right to amend or supplement my opinions based on further discovery, claim construction rulings, other developments, and information provided in this case.

6. I am being compensated for my work and travel expenses in connection with this proceeding at my standard consulting rate of $600 per hour. My compensation is in no way dependent on or contingent on the outcome of my analysis or opinions rendered in this proceeding and is in no way dependent on or contingent on the results of these or any other proceedings relating to the '858 Patent.

II. BACKGROUND AND QUALIFICATIONS

A. Qualifications and Experience

7. My qualifications and publications can be found in my Curriculum Vitae, which is attached as Exhibit 1. My background and experience qualify me to offer the opinions offered in this Declaration and are described below.

8. In 1984, I received my Bachelor of Technology (Honors) in Electronics and Electrical Communication Engineering at the Indian Institute of Technology (IIT) in Kharagpur, India. In 1989, I obtained my Ph.D. in Electrical Engineering and Computer Science at the University of California, Berkeley. That year, I also received the Demetri Angelakos Outstanding Graduate Student Award from the University of California, Berkeley, and the IEEE/ACM[1] Ira M. Kay Memorial Paper Prize. I authored several papers and proposals during this time, including "Multilevel Range/NEXT Performance in Digital Subscriber Loops", IEEE Proceedings on Communications, Speech and Vision, Vol 136, Issue 2, April 1989, and "Comparison of Line Codes and Proposal for Modified Duobinary", Contribution T1D1.3-85- 237, American National Standards Institute, November 1985.

9. In 1989, I joined the faculty at Georgia Tech. My first position was an assistant professor position. I became an associate professor in 1995. In 1997, I was awarded the VHSIC Hardware Description Language (or VHDL) International Best Ph.D. Dissertation Advisor for my contributions in the area of rapid prototyping. I became a full professor in 1998 and have maintained that title ever since. As a faculty member at Georgia Tech, I have been an active contributor in several disciplines, including technologies, image and video processing, computer

[1] IEEE is the Institute of Electrical and Electronics Engineers. ACM is the Association for Computing Machinery.

engineering, embedded systems, chip design, software systems, wireless networks, and cellular communications.

10. Since 1995, I have authored, co-authored, or edited several books in the areas of communications, signal processing, chip design, and software engineering, including VLSI DIGITAL SIGNAL PROCESSORS (1st ed. 1995), QUICK-TURNAROUND ASIC DESIGN IN VHDL (1st ed. 1996), THE DIGITAL SIGNAL PROCESSING HANDBOOK (2d. ed. 2010), CLOUD COMPUTING: A HANDS-ON APPROACH (1st ed. 2013), INTERNET OF THINGS: A HANDS-ON APPROACH (1st ed. 2014), and BIG DATA SCIENCE & ANALYTICS (1st ed. 2016).

11. Between 1998 and 2004, my students and I studied different codecs and published IETF draft standards[2] on audio and video streaming applications over the internet including:

a. V. Madisetti and A. Argyriou: Voice and Video over Mobile IP Networks, IETF Draft, May 20, 2002; and

b. V. Madisetti and A. Argyriou: A Transport Layer Technology for Improving QoS of Networked Multimedia Applications, IETF Draft July 25, 2002.

12. I have served on the paper-reviewing committees for many leading conferences in my field, and I have taken on editorial roles for leading technical journals in fields pertinent to my research. For example, I served as the Editor-in-Chief of the IEEE Press/CRC Press's three-volume Digital Signal Processing Handbook for Edition 1 (1998) and Edition 2 (2010). I have also authored over 100 articles, reports, and other publications pertaining to electrical engineering, and in the areas of computer engineering, communications signal processing, and communications.

13. Throughout my time at Georgia Tech, I have designed several specialized computer and communication systems for tasks such as wireless, audio, video, and protocol processing for

[2] IETF is the Internet Engineering Task Force.

portable platforms (like cell phones and PDAs). I have also been actively involved in the areas of wireless communication, software engineering, system design methodologies, and software systems.

14. Beyond my work in academia, I have worked in industries relating to speech, audio, and image processing since the early 1980s. I developed efficient algorithms for echo cancellers for speech and voice applications that reduce complexity and improve performance. This work resulted in a peer-reviewed publication called "Dynamically Reduced Complexity Implementation of Echo Cancellers," IEEE ICASSP 96, Tokyo.

15. From 1999-2003, I consulted with a team of engineers to design an integrated Soft Switch & Media Server, the SNX 850/8500, that was being sold and installed in Asia. The SNX 8500 was a one-box solution to VOIP, LAN switching, and iPBX/PBX solutions for enterprise customers, and has been installed as part of BPL Telecom's then offerings in Asia. The PBX modules within SNX 850/8500 supported Analog Phones, Digital Feature Phones, E1/ISDN PRI Trunks, E1 or PRI at the PSTN gateway, VOIP (SIP) soft phones, SS7 interfaces, and operated via a browser-based console. It included a variety of features, such as Automatic Call Back, Busy Override, Do Not Disturb, etc., through support for 16 ISDN BRI circuits.

16. From 2000-2001, I designed three Global System for Mobiles multiband mobile phones for a leading telecom equipment manufacturer in Asia.

17. From 2000-2007, I designed and provided optimized mobile speech to one of the leading mobile phone and base station manufacturers in the world. This implementation has been deployed on millions of 3G/4G mobile phones and numerous base stations.

18. During that same time frame, I also designed and provided several VOIP codecs to leading VOIP phone vendors that are now deployed in several generations of enterprise VOIP

phone products in the USA and abroad. I designed and provided echo cancellers for VOIP applications.

19. From 2002-2007, I developed wireless baseband and protocol stack software and assembly code for a leading telecommunications handset vendor. The software and code focused on efficient realization of speech codecs and echo-cancellation and optimization of 3G software stack. My work included creating software code and analyzing and revising existing software code. I have also developed speech and video codecs that comply with 3GPP standards.[3] I developed software to implement the associated 3GPP standards and developed tests to verify compliance with these standards. I have also developed several speech and VOIP codecs that conform with the ITU (International Telecommunications Union) standards G.723.1, G.729 and Echo Cancellers conforming with the ITU G.168 standards.

20. The software and code I have developed and tested based on the ITU standards are now used by one of the leading suppliers of VOIP/Internet telephones in the world. This software is also part of commercially released soft switches for internet telephony used extensively in Asia.

21. In addition to my academic and industrial pursuits, I am also a long-standing member of several professional technical organizations. I was the Technical Program Chair for both the IEEE MASCOTS in 1994 and the IEEE Workshop on Parallel and Distributed Simulation in 1990. More recently, I was elected to the Fellowship of the IEEE because of my contributions to embedded computing systems. Fellows are in the highest tier of membership in the IEEE, a world professional body consisting of over 300,000 electrical and electronics engineers. Only 0.1% of the IEEE membership is elected to the Fellowship each year.

[3] 3GPP stands for 3rd Generation Partnership Project.

22. I also serve as the official representative from Georgia Tech to the 3GPP/ETSI[4] standards organization. As such, I am familiar with the standard processors for speech, audio and video applications in the context of mobile and wireless communications.

23. Through the past twenty years, I have been retained to test various commercial mobile and wireless products to determine if they comply with various technical standards. I have participated in and contributed to activities of Standards Setting Organizations ("SSOs") such as the IEEE, IETF, ETSI, and others, as part of my work as a teacher and researcher in advanced telecom, wireless, and computer technologies.

24. Over the past three decades, I have studied and designed image and video processing and wireless networking circuits for numerous applications, including digital and video cameras, mobile phones, and networking products for leading commercial firms.

25. In light of my academic and professional backgrounds, I am qualified to provide opinions regarding the state of the art when the '858 Patent was filed in June 28, 2000. I am considered a person of ordinary skill in the art (POSITA) both now and when the patent was filed, and I am qualified to explain how a POSITA would have interpreted and understood the '858 Patent at that time.

26. I am generally familiar with issues involving patents and with determining the meaning of patent claim terms from the perspective of a POSITA at the time the purported invention was made. I have submitted approximately 40 invention disclosures and provisional patents of my own over the past ten years. I am listed as the inventor on eight allowed or issued U.S. Patents. As an expert, I have completed reports, depositions, and provided testimony regarding communications systems in more than 20 proceedings over the past six years.

[4] ETSI stands for European Telecommunications Standards Institute.

B. Legal Standards

27. I am not an attorney, but I understand certain aspects of patent law as they relate to my analysis and opinion.

28. I understand that patents include various claims that collectively describe how the invention works. Language in the patent claims is given the meaning that would be understood by a POSITA at the time of the invention. I understand that a term should have a different meaning only when the patentee has acted as a lexicographer and clearly disclaimed the term's plain and ordinary meaning.

29. I understand that the intrinsic evidence should be considered first when determining a term's meaning. Intrinsic evidence includes the claim language, the specification, and the file history from the United States Patent and Trademark Offices. The intrinsic evidence provides the best source of information on the meaning of the claim terms.

30. I understand that patents may contain embodiments as examples of how the invention may work. These embodiments are not limitations on the claim language.

31. I understand that in some circumstances, extrinsic evidence may also be considered so long as it does not conflict with the intrinsic evidence. Dictionaries and expert opinions are types of extrinsic evidence, and I understand that neither dictionaries nor expert opinions can be used to limit the claim terms.

32. I understand that certain claim terms are "means-plus-function" terms that describe features of the invention according to a function and a structure. "Means-plus-function" terms are presumptively valid. I understand that those seeking to invalidate a patent based on indefiniteness have the burden to prove that any means-plus-function terms are indefinite. I also understand that means-plus-function terms are valid when a POSITA can identify the structure of the term based on the intrinsic evidence.

C. Person of Ordinary Skill in the Art

33. I understand that the patent terms are construed in view of what a POSITA would understand. Here, the relevant art relates to telephony, client-server communications, audioconferencing, and videoconferencing.

34. Given my educational and professional background, I understand that I am a POSITA. My opinions are based on my knowledge as a POSITA.

III. OVERVIEW OF THE '858 PATENT

35. As more people gained access to the Internet, "computer scientists began experimenting with exchanging voice using personal computers (PCs) equipped with microphones, speakers, and sound cards." '858 Patent, 1:43-44. Voice over IP (VoIP) took off in 1996 when the International Telecommunications Union-Telecommunications sector adopted the H.323 Internet Telephony Standard. '858 Patent, 1:47-49. With the influx of new VoIP phones, conferencing servers (or multipoint control units) developed to host audio conferences where participants could connect in one of two ways: (1) using traditional phone equipment over the PSTN or (2) using PC-based equipment over the PSTN. '858 Patent, 1:56-59.

36. US Patent No. 6,683,858 discloses a "system, method, and computer program product which allows both mixing (e.g., PC-based) and non-mixing (e.g., phone-based) clients to participate in a single audio conference." '858 Patent, Abstract.

IV. OPINION ON CLAIM TERMS

37. I have been asked to opine about several disputed terms in this matter within the context of the '858 Patent. My analysis of each of these terms follows.

A. "a multiplexed stream" / "said multiplexed stream" (claims 1, 2, 6, 7)

38. The term multiplexed stream should be given its plain and ordinary meaning. Both "multiplexed" and "stream" are terms that are familiar to a POSITA. As Mr. Bress states, multiplexing is a "well-understood technique for transmitting a number of separate signals simultaneously over a single channel or line." Bress Decl. ¶ 41. Multiplexing may "separate the signals by time, space, or frequency." Ex. 2, *Multiplexing*, Microsoft Press Computer Dictionary (3d ed. 1997) (PT_0000109). The Patent does not limit itself to any one kind of multiplexing, and there is no need to construe multiplexing as only "interleaving." A POSITA would not construe "multiplexing" as "interleaving" to the exclusion of all other forms of multiplexing, and this limitation should be rejected.

39. "Stream" refers to a type of transmission and an associated type of processing. A POSITA would understand that a "stream" means a flow of data where processing is performed as the data is received rather than waiting for the entire transmission to be received. For example, "streaming" a movie does not require the display device to download the entire movie and then display the movie but refers to the flow of data that is being consumed and displayed as received. Therefore, a "stream" refers to "a flow of information," which is consistent with the Microsoft Computer Dictionary definition of "output stream" as "a flow of information that leaves a computer system and is associated with a particular task or destination." Ex. 2, *Output Stream*, Microsoft Press Computer Dictionary (5th ed.) (PT_0000374).

40. Mr. Bress uses a slightly different definition of "stream". He defines a stream as "any data transmission, such as the movement of a file between disk and memory that occurs in a continuous flow" from the Microsoft Dictionary. *See* Bress Decl. ¶ 41(citing *Stream*, Microsoft Dictionary (4th ed. 1999)). However, Mr. Bress interprets the word "continuous" in far too narrow

of a fashion indicating that "continuous" means "unbroken." Bress Decl. ¶ 41. Streams may indeed be broken, as anyone with a poor internet connection can attest to when they are streaming a movie. Moreover, streams may be paused as well. Instead, "continuous" in stream processing typically means without undue delay. Streams require processing to keep up with the rate that data is appearing, or buffers will eventually be exceeded, and data dropped. Likewise, if streams are being passed further down the processing pipeline, a delay in one stage will affect the entire rate of processing.

41. Mr. Bress further requires that "a multiplexed stream" be a "data structure." Bress Decl. ¶ 42. However, in stream processing, data is not always stored in a data structure before being sent. The data may be transmitted to its destination (e.g., a file, the Internet, etc.) as it is generated. Such processing is not uncommon when dealing with streams to avoid any undue delay for any subsequent processing steps that rely upon the stream.

42. In addition, Mr. Bress adds another limitation that only audio data may be included within the stream. Bress Decl. ¶ 43. The '858 Patent contains no such limitation. In contrast, the '858 Patent explicitly considers information other than audio information as part of these streams such as "inserting proprietary code into the audio Stream or control stream." '858 Patent 5:36-40. The Patent thus makes it clear that the streams may contain more than audio information.

43. Given that both "multiplexing" and "stream" are well-known terms, "multiplexed stream / said multiplexed stream" should be given its plain and ordinary meaning.

V. "PC-based equipment" (claims 4, 9)

44. The term "PC-based equipment" must be interpreted in the time frame of the patent, which was filed on June 28, 2000. The Patent distinguishes between "traditional phones" and "PC-

based equipment" based on how the devices connect to audio conferences. Traditional phones connect via the PSTN. *Id.* 1:58-59. PC-based equipment connect via the Internet. *Id.*

45. The Patent also distinguishes between PC-based equipment and phones based on their abilities to mix audio streams. PC-based equipment can mix audio streams due to their more advanced processing capabilities versus phones, which cannot mix audio streams. '858 Patent, 2:20. Step 312 in Figure 3 details the determination of whether or not party "j" is a client with mixing capabilities or not. *Id.* 5:27-29. Mr. Bress states as much, writing "mixing (e.g., PC-based) and non-mixing (e.g., phone-based) clients." Bress Decl. ¶ 31. Today, smart phones are capable of significant processing tasks and computing capabilities that significantly exceed that of traditional PCs from the year 2000. Given that the Patent uses the term "PC-based equipment" to denote the processing capabilities of devices, "device for personal computing" is the properly inclusive definition of "PC-based equipment."

VI. "means for removing …" (claims 7, 8)

46. It is my understanding that the parties agree on the function of these terms but not the structure. However, the '858 Patent clearly discloses both a structure (the "mixer 118") and an algorithm that performs the "means for removing" functions recited in claims 7 and 8.

47. First, the Patent discloses the "mixer 118" in prose. According to the Patent's text, the "mixer 118" contains the "buffer 202," which receives audio packets from clients. '858 Patent, 4:37. The "mixer/multiplexer ('mix/mux') 208" creates multiplexed audio packets (for mixing clients) and mixed audio streams (for non-mixing clients). *Id.* The "packet sender 210" then sends the packets and streams to the respective client groups. *Id.* 4:64-65.

48. Before packets and streams are sent to clients, the "mixer 118" detects events using the event-driven "switch 204." *Id.* 4:41-42. When "the mixer 118" detects an event, it triggers a

response from "control flow 300." *Id.* 5:3-7. The "control flow 300" element is connected to the "mixer 118" and provides the control logic that directs the "mixer 118." The "control flow 300" uses the "packet mixer/multiplexor 208" to multiplex audio data for each active speaker. *Id.* 5:44-46.

49. "In step 314, active speaker audio data for every active speaker is multiplexed. However, as will be apparent to those skilled in the relevant art(s), if party j is an active speaker, step 314 will not include party j's own audio data in the multiplexed packets." *Id.* 5:44-50. As a POSITA, I recognize that the Patent is describing the creation of a multiplexed stream for the user j that does not include any audio packets from that user as stated by the Patent itself.

50. Next, the Patent discloses the "mixer 118" as the structure of the Patent using several figures. Figures 1-3 depict the role of the "mixer 118" as it relates to many other elements of the Patent, including the "buffer 202," the "mixer/multiplexer ("mix/mux") 208," and the "control flow 300."

51. Working backwards from the client's receipt of audio data, Figure 3 depicts the "control flow 300" that is responsible for sending packets to mixing and non-mixing clients alike. *Id.* 5:55-6:2. Figure 3 is reproduced below.

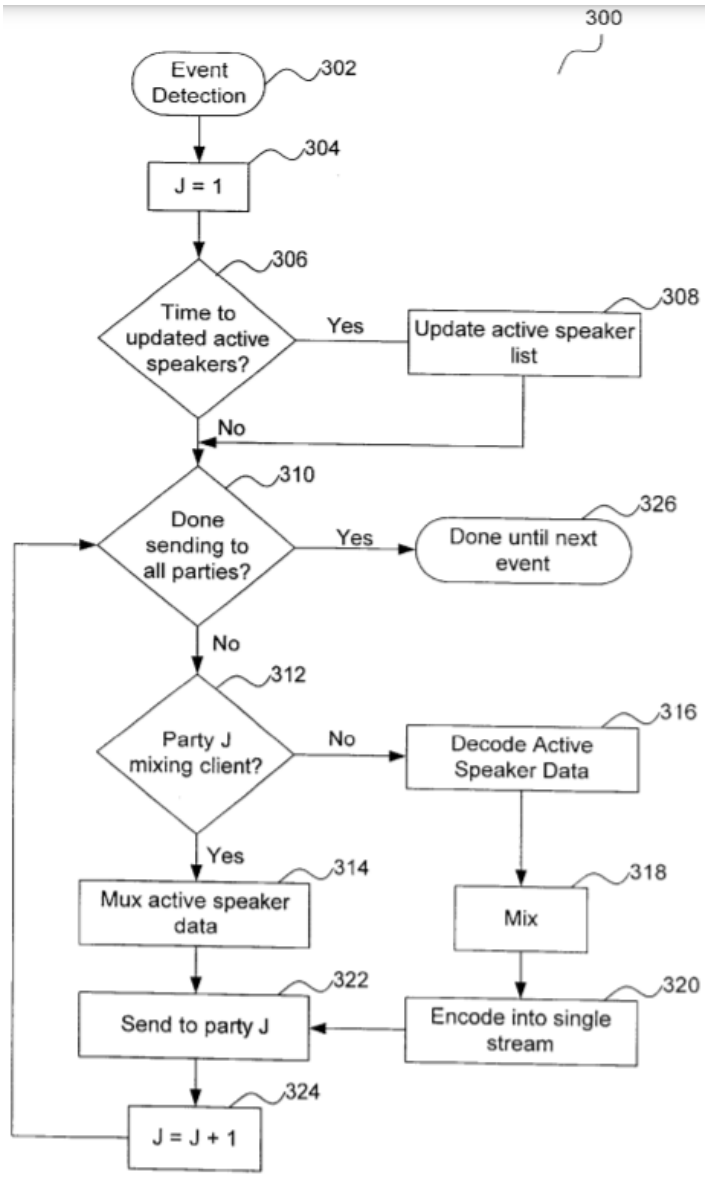


FIG. 3

52. Figure 2 displays the "mix/mux 208" that is used in steps 314 and 312 (depicted above in Figure 3). '858 Patent, 5:44-46 ("In step 314, control flow 300 multiplexes [by employing "mix/mux 208"] the audio stream data [stored on "retriever 206"] for all k active speakers."). The

"mix/mux 208" is a component of the "mixer 118" that forms multiplexed audio packets and mixed audio streams. *Id.* at 4:50-54.

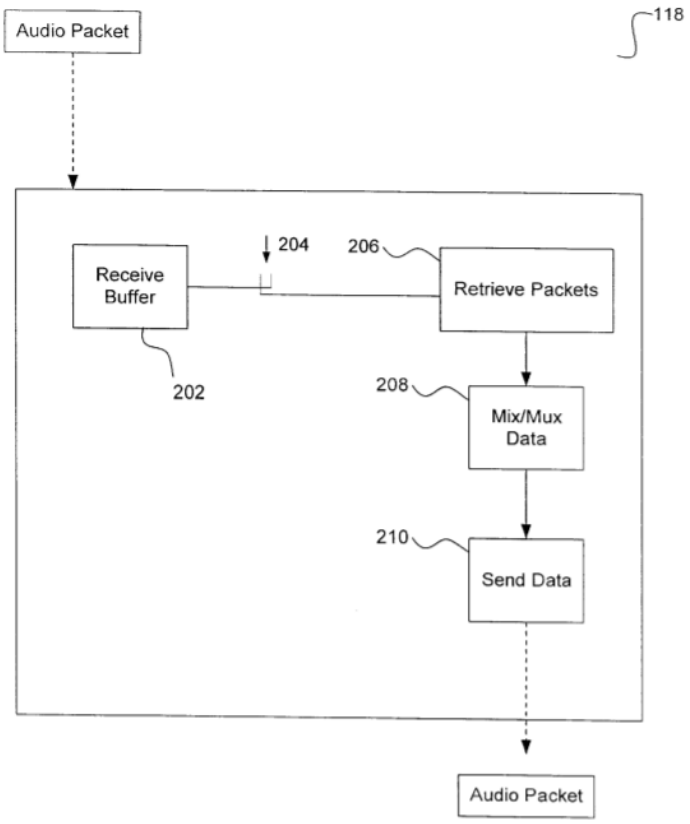
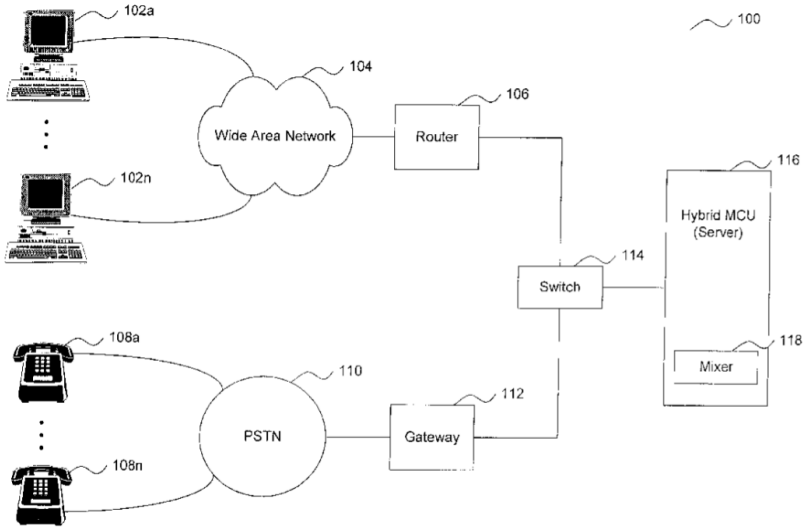


FIG. 2

53. Lastly, Figure 1 shows that the "mix/mux 208" is part of the "mixer 118," which is a component of the "Hybrid MCU (Server) 116." After reviewing Figures 1-3, it is obvious to a POSITA that the "mixer 118" is the relevant structure for these terms.



54. Given the Patent's language and figures that depict the "mixer 118" as the structure of claims 7 and 8, I disagree with Mr. Bress's position that the Patent fails to disclose a proper structure.

55. I also disagree with Mr. Bress's argument that the means-plus-function terms require an algorithm. I understand that when a microprocessor performs the function of a claim, an algorithm is required. However, the "mixer 118" is not a microprocessor. It is a component part of the "Hybrid MCU Server 116," depicted in Figure 1 above. The "mixer 118" is a specially programmed element of the MCU server.

56. Even if the "mixer 118" required an algorithm, the Patent sufficiently discloses one. The Patent uses both text and figures that allow a POSITA to conclude that the "mixer 118" performs the "means for removing" functions.

57. Mr. Bress states that "the process is repeated using the same set of input audio packets, the resulting audio payload in each output multiplexed data packet will be the same for

each mixing client." Bress Decl. ¶ 43. But this statement that a single multiplexed stream is created and sent to each mixing client is inconsistent with the description in the Patent. Figure 3 of the Patent shows potentially different streams being created and sent to each client depending on which client "j" is being sent to. Each loop in Figure 3 depends on the client "j" and performs either mixing or multiplexing depending on the capabilities of the client "j". Furthermore, the '858 Patent details the removing step as part of the creation of this multiplexed or mixed stream.'858 Patent 5:44-65. It would not make sense to a POSITA to create the same stream over and over again for each client, which would entail redundant work to create identical data repeatedly. However, in the context of claims 7 and 8 as well as Figure 3, it is clear that the stream may be different for each client "j" and that the difference entails building a custom multiplex or mixed stream for each client omitting their own audio, which is consistent with the processing found in Figure 3.

58. I reserve the right to amend and/or supplement the foregoing in accordance with applicable Court rules, orders, and procedures. I declare under the penalty of perjury under the laws of the United States of America that, to the best of my knowledge, the foregoing is true and correct.

Dated: January 4, 2022

By:_____
Dr. Vijay K. Madisetti